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Date: Thursday, March 3, 2016

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**Assessment of anti-bacterial activity of silver ions in infected diabetic foot ulcers – An answer to antibiotic resistance**A.P. Ignatius<sup>1,\*</sup>, R. Tellis<sup>2</sup><sup>1</sup> AJ INSTITUTE OF MEDICAL SCIENCES, MANGALORE, KARNATAKA, India<sup>2</sup> Yenepoya medical college, Mangalore, karnataka, India

**Background:** Easy accessibility and irrational use of antibiotics has led to emergence and spread of multidrug bacteria in nosocomial and community settings. MDR strains of *Pseudomonas aeruginosa*, *Staphylococcus aureus* and Enterobacteriaceae are commonly isolated from infected diabetic ulcers. Escalating antibiotic resistance has led us to reconsider use of heavy metals particularly silver which is known to reduce bacterial burden in infected wounds. This study aims to assess the bactericidal and clinical effect of silver alginate foam dressings on infected diabetic foot ulcers.

**Methods & Materials:** Fifty cases of infected diabetic foot ulcers were studied. Quantitative bacterial cultures on sheep blood agar were performed as baseline (prior to treatment) and at 7 and 14 days following treatment with silver alginate dressing. Results of quantitative cultures were co-related with clinical improvement in ulcer size and local signs of infection. Bacteria isolated were identified and antibiogram was determined as per CLSI guidelines. Killing curves were recorded by inoculating the surface of silver alginate dressing with 10<sup>5</sup> bacteria. Sensitivity and duration of silver ion activity was assessed by disc diffusion method on nutrient agar using 7mm disc of silver dressing. Growth inhibition zone diameters were recorded by serial transfer of silver ion foam disc onto freshly inoculated plates for 7 consecutive days.

**Results:** Bacteria isolated included *S.aureus* 32% (28% MRSA), *E.coli* 24% (39% ESBL producers, 12% MBL producers), *P.aeruginosa* 37% (15% MBL producers), *Enterobacter spp* 4% and *Citrobacter* 3%. Killing curves showed sterility approximately one to 2.5 hours following exposure to silver ions. All the isolates were sensitive to silver ions irrespective of their antibiotic resistance status. Growth inhibition zone diameters were maintained steady upto 7 days. In all cases decrease in bacterial load was associated with decrease in ulcer size.

**Conclusion:** This study shows topical use of silver ions could serve as an effective alternative to topical or oral antibiotics in management of infected wounds. When used once weekly silver alginate foam dressing appears to be effective in reducing wound bio-burden which is positively associated with ulcer healing. Thus we can conclude that silver ions can be used effectively for treatment of chronic ulcers.

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**Antimicrobial susceptibility pattern and sequence analysis of DNA gyrase and DNA topoisomerase IV in salmonella enterica serovars typhi and paratyphi A at a tertiary care centre in North India**

R. Misra

SGPGIMS, Lucknow, Uttar Pradesh, India



**Background:** The aim of this study was to determine the antimicrobial susceptibility pattern of typhoidal *Salmonella* isolates recovered from human infections as well as to investigate the association of quinolone resistance with mutations in the genes coding for DNA gyrase and topoisomerase IV.

**Methods & Materials:** The study was conducted at Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, India from January 2013 to September 2015. A total of 96 *Salmonella enterica* serotypes Typhi, Paratyphi A and B recovered from blood cultures in cases of enteric fever were included in the study. Antimicrobial susceptibility testing was performed by Kirby-Bauer disc diffusion as well as E-test to the following agents: ampicillin, chloramphenicol, trimethoprim-sulfamethoxazole, nalidixic acid, ofloxacin, ciprofloxacin, levofloxacin and ceftriaxone. Results were interpreted as per the Clinical and Laboratory Standards Institute guidelines, 2015. Genotypic characterization included the screening of mutations in the quinolone resistance-determining regions (QRDR) of *gyrA*, *gyrB*, *parC*, and *parE* by PCR. Purified PCR reactions were sequenced by Sanger sequencing and analyzed by Clustal W multiple sequence alignment tool in 60 isolates.

**Results:** A total of 96 isolates of *S. enterica* serovars Typhi, Paratyphi A and B respectively were recovered during the study period. *S. Typhi* was the predominant serotype (n = 77), followed by *S. Paratyphi A* (n = 17) and *S. Paratyphi B* (n = 2). Only 4 out of 77 *S. Typhi* were resistant to ampicillin, chloramphenicol and trimethoprim-sulfamethoxazole while none of the *Paratyphi A* or *B* were multi-drug resistant. All *S. Typhi* isolates except two were nalidixic acid resistant (NAR). All *Paratyphi A* were NAR. Decreased ciprofloxacin susceptibility was seen in 63 out of 77 *S. Typhi* recovered (81.8%). Complete resistance to ciprofloxacin was observed in 12 isolates. No resistance to ceftriaxone was documented. The most common mutation in *gyrA* was at codon Ser83 to phenylalanine (n = 34) or tyrosine (n = 12). Five *S. Typhi* isolates that were resistant to ciprofloxacin had a second mutation at Asp87 to Asn in the *gyrA* gene.

**Conclusion:** The change in the susceptibility pattern of chloramphenicol, ampicillin, and cotrimoxazole is noteworthy. There is a need to review the use of fluoroquinolones for the management of enteric fever in endemic areas.

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